Appln. No. 10/707,422
Docket No. 139805/GEM-0091

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (currently amended) A focal spot sensing device comprising:

a housing that resists x-ray beams;

an opening disposed in a wall of the housing that allows an x-ray beam to enter the housing; and

a sensor device disposed in the housing for interpreting a position of the x-ray beam for calculating a position of a focal spot, the sensor device being disposed in the housing such that an area of the x-ray allowed to fall on the sensor device changes in both position and size at the sensor device in response to movement of the focal spot in a plane parallel to the plane of the sensor device;

wherein the opening is sized such that the x-ray beam at a surface of the sensor device is less than a total sensitive area of the sensor device;

wherein the sensor device includes at least two detector elements arranged next to each other, and wherein the opening and the at least two detector elements are disposed, such that the x-ray beam passing through the opening is allowed to strike more than one of the at least two detector elements, but only on just a portion of each of the at least two detector elements capable of receiving the x-ray beam, the portion being less than 100% of a sensitive area of an associated detector element;

wherein a change in output signal of each detector element of the sensor device is responsive to a change in position and size of the area of x-ray allowed to fall on each detector element of the sensor device in response to the movement of the focal spot; and

wherein the change in output signal is a position indicator for the focal spot.

2. (original) The device of claim 1, wherein the opening is sized so that the x-ray beam strikes the sensor device.

3-4. (canceled)

5. (currently amended) The device of claim ~~[[4]]~~ 1, wherein the at least two detector elements include a scintillator and a photodiode.

6. (original) The device of claim 1, wherein the sensor device includes a fluorescent screen, which faces the opening so that the x-ray beam strikes the fluorescent screen, and a position sensitive photodiode that is arranged between the fluorescent screen and a back wall of the housing.

7. (original) The device of claim 6, wherein the opening is dimensioned to be approximately a pinhole.

8. (original) The device of claim 6, wherein the fluorescent screen is optically coupled to the position sensitive photodiode.

9. (original) The device of claim 8, wherein the fluorescent screen is optically coupled to the position sensitive photodiode by a transparent epoxy layer.

10. (original) The device of claim 1, further comprising a control mechanism in electronic communication with the sensor device.

11. (original) The device of claim 10, wherein the control mechanism calculates the focal spot movement and compensates for detector response error induced by focal spot movement.

12. (currently amended) A focal spot sensing device comprising:

a housing that resists x-ray beams;

an opening disposed in the housing that allows an x-ray beam to enter the housing; and

means for calculating a position of a focal spot;

wherein the opening is sized such that the x-ray beam at a surface of the means for calculating is less than a total sensitive area of the means for calculating;

wherein an area of the x-ray is allowed to fall on the means for calculating such that the area changes in both position and size at the means for calculating in response to movement of the focal spot in a plane parallel to the plane of the means for calculating;

wherein the means for calculating includes at least two detector elements arranged next to each other and the opening is sized so that the x-ray beam strikes more than one of the at least two detector elements, but only a portion of each, the portion being less than 100% of a sensitive area of an associated detector element;

wherein a change in output signal of each detector element of the means for calculating is responsive to a change in position and size of the area of x-ray allowed to fall on each detector element of the means for calculating in response to the movement of the focal spot; and

wherein the change in output signal is a position indicator for the focal spot.

13. (original) The device of claim 12, wherein the opening is sized so that the x-ray beam strikes the means for calculating.

14-15. (canceled)

16. (original) The device of claim 12, wherein the means for calculating includes a fluorescent screen, which faces the opening so that the x-ray beam strikes the fluorescent screen, and a position sensitive photodiode that is arranged between the

fluorescent screen and a back wall of the housing; and the opening is dimensioned to be approximately a pinhole.

17. (original) The device of claim 16, wherein the fluorescent screen is optically coupled to the position sensitive photodiode by a transparent epoxy layer.

18. (original) The device of claim 12, further comprising a control mechanism in electronic communication with the means for calculating a position of a focal spot.

19. (original) The device of claim 18, wherein the control mechanism calculates the focal spot movement and compensates for detector response error induced by focal spot movement.

20. (currently amended) An imaging system comprising:

an x-ray source that produces an x-ray beam and has a focal spot;

a detector array that receives the x-ray beam and includes a focal spot sensing device, the focal spot sensing device includes: a housing that resists x-ray beams; an opening disposed in a wall of the housing that allows the x-ray beam to enter the housing; and a sensor device disposed in the housing that interprets a position of the x-ray beam for calculating a position of the focal spot, the sensor device being disposed in the housing such that an area of the x-ray allowed to fall on the sensor device changes in both position and size at the sensor device in response to movement of the focal spot in a plane parallel to the plane of the sensor device;

wherein the opening is sized such that the x-ray beam at a surface of the sensor device is less than a total sensitive area of the sensor device;

wherein the sensor device includes at least two detector elements arranged next to each other and the opening is sized so that the x-ray beam strikes more than one of the at least two detector elements, but only a portion of each, the portion being less than 100% of a sensitive area of an associated detector element;

wherein a change in output signal of each detector element of the sensor device is responsive to a change in position and size of the area of x-ray allowed to fall on each detector element of the sensor device in response to the movement of the focal spot; and

wherein the change in output signal is a position indicator for the focal spot.

21. (previously presented) The system of claim 20, wherein the opening is sized so that the x-ray beam strikes the sensor device.

22-23. (canceled)

24. (previously presented) The system of claim 20, wherein the sensor device includes a fluorescent screen, which faces the opening so that the x-ray beam strikes the fluorescent screen, and a position sensitive photodiode that is arranged between the fluorescent screen and a back wall of the housing; and the opening is dimensioned to be approximately a pinhole.

25. (previously presented) The system of claim 24, wherein the fluorescent screen is optically coupled to the position sensitive photodiode by a transparent epoxy layer.

26. (original) The system of claim 20, further comprising a control mechanism in electronic communication with the detector array and the x-ray source.

27. (currently amended) A method for sensing a focal spot, the method comprising:

receiving an x-ray beam into an opening of a focal spot sensing device, the focal spot sensing device having a sensor device;

receiving the x-ray beam at the sensor device disposed in the focal spot sensing device, wherein the sensor device includes at least two detector elements arranged next to

each other such that the x-ray beam passing through the opening is allowed to strike more than one of the at least two detector elements, but only a portion of each, the portion being less than 100% of a sensitive area of an associated detector element;

measuring a change in output signal of each detector element in response to a change in position and size of the area of x-ray allowed to fall on each detector element in response to the movement of the focal spot;

interpreting a position of the x-ray beam; and

calculating a position of the focal spot in response to an area of the x-ray beam allowed to fall on the sensor device changing in both position and size at the sensor device in response to movement of the focal spot in a plane parallel to the plane of the sensor device;

wherein a change in output signal of the sensor device is responsive to a change in position and size of the area of x-ray allowed to fall on the sensor device in response to the movement of the focal spot; and

wherein the change in output signal is a position indicator for the focal spot.

28. (previously presented) The method of claim 27, further comprising calibrating a CT system detector in response to the position of a focal spot.

29. (canceled)

30. (previously presented) The method of claim 27, further comprising receiving the x-ray beam at the sensor device disposed in the focal spot sensing device, the sensor device includes a fluorescent screen, which faces the opening so that the x-ray beam strikes the fluorescent screen, and a position sensitive photodiode that is arranged between the fluorescent screen and a back wall of the focal spot sensing device.

31. (previously presented) The method of Claim 27, wherein the sensor device comprises at least two detector elements, and further comprising:

allowing the x-ray beam to fall on just a portion of each of the at least two detector elements.

32. (canceled)